IN THE SPECIFICATION:

Kindly replace the paragraph beginning on page 5, line 17, with the following:

According to a first aspect of the present invention a method is provided to perform low-density parity-check code encoding of user data u of length N_u, by inserting parity data p of length N_p into output data c of length N in accordance with a parity matrix H such that $\mathbf{H \bullet c} = 0$, comprising the steps of: (a) receiving the user data of block length N_u; (b) decomposing $\mathbf{H \bullet c}$ into a first component $\mathbf{H_u \bullet u}$ corresponding to the user data and a second component $\mathbf{H_p \bullet p}$ corresponding to the parity data such that $\mathbf{H \bullet c} = \mathbf{H_u \bullet u} + \mathbf{H_p \bullet p} = 0$; (c) calculating a vector $\underline{u} = \mathbf{H_u \bullet u}$; and (d) calculating ~~$p = \mathbf{H_u}^{-1} \cdot \underline{u}$~~ $p = \mathbf{H_p}^{-1} \bullet \underline{u}$.

Kindly replace the paragraph beginning on page 6, line 7, with the following:

According to an eighth aspect of the present invention, a low-density parity-check code encoder is provided to encode user data u of length N_u, by inserting parity data p of length N_p into output data c of length N in accordance with a parity matrix H such that $\mathbf{H \bullet c} = 0$. An input inputs the user data of block length N_u, an H c decomposer decomposes $\mathbf{H \bullet c}$ into a first component $\mathbf{H_u \bullet u}$ corresponding to the user data and a second component $\mathbf{H_p \bullet p}$ corresponding to the parity data such that $\mathbf{H_u \bullet u} + \mathbf{H_p \bullet p} = \mathbf{0}$. A $\underline{u}$ calculator to calculate a vector $\underline{u} = \mathbf{H_u \bullet u}$, and a $p = \underline{P}\,\underline{u}$ calculator to calculate ~~$p = \mathbf{H_u}^{-1} \cdot \underline{u}$~~ $p = \mathbf{H_p}^{-1} \bullet \underline{u}$.

Kindly replace the paragraph beginning on page 6, line 24, with the following:

According to a thirteenth aspect of the present invention, the $\underline{u}$ calculator calculates the vector $\underline{u} = \mathbf{H_u \bullet u}$ prior to the $p = \underline{P}\,\underline{u}$ calculator calculating ~~$p = \mathbf{H_u}^{-1} \cdot \underline{u}$~~ $p = \mathbf{H_p}^{-1} \bullet \underline{u}$.

Kindly replace the paragraph beginning on page 6, line 26, with the following:

According to a fourteenth aspect of the present invention, a computer program is provided to perform low-density parity-check code encoding of user data u of length N_u, by inserting parity data p of length N_p into output data c of length N in accordance with a parity matrix H such that $\mathbf{H \bullet c} = 0$, comprising the steps of (a) receiving the user data of block length N_u; (b) decomposing $\mathbf{H \bullet c}$ into a first component $\mathbf{H_u \bullet u}$ corresponding to the user data and a second component $\mathbf{H_p \bullet p}$ corresponding to the parity data such that $\mathbf{H_u \bullet u + H_p \bullet p = 0}$; (c) calculating a vector $\underline{u} = \mathbf{H_u \bullet u}$; and (d) calculating ~~$\mathbf{p = H_u^{-1} \cdot \underline{u}}$~~ $\underline{p = \mathbf{H_p^{-1}} \bullet u}$.

Kindly replace the paragraph beginning on page 7, line 3, with the following:

According to a fifteenth aspect of the present invention, 22, a data transmission system is provided for transmitting user data to and receiving data from a communication channel. A low-density parity-check code encoder the user data u of length N_u, by inserting parity data p of length N_p into output data c of length N in accordance with a parity matrix H such that $\mathbf{H \bullet c} = 0$. The encoder comprises an input to input the user data of block length N_u; and H c decomposer to decompose $\mathbf{H \bullet c}$ into a first component $\mathbf{H_u \bullet u}$ corresponding to the user data and a second component $\mathbf{H_p \bullet p}$ corresponding to the parity data such that $\mathbf{H_u \bullet u + H_p \bullet p = 0}$; a $\underline{u}$ calculator to calculate a vector $\underline{u} = \mathbf{H_u \bullet u}$; and a $p = \underline{P}\,\underline{u}$ calculator to calculate ~~$\mathbf{p = H_u^{-1} \cdot \underline{u}}$~~ $\underline{p = \mathbf{H_p^{-1}} \bullet u}$. A transmitter transmits an output of the low-density parity-check code encoder to the communication channel. A soft channel decoder decodes data from the communication channel, and a soft low-density parity-check code decoder decodes data decoded by the soft channel decoder.

Kindly replace the paragraph beginning on page 7, line 16, with the following:

According to a sixteenth aspect of the present invention, a low-density parity-check code encoder encodes user data u of length N_u, by inserting parity data p of length N_p into output data c of length N in accordance with a parity matrix H such that $\mathbf{H \bullet c} = 0$. An input means is provided for inputting the user data of block length N_u, and an H c decomposer means decomposes $\mathbf{H \bullet c}$ into a first component $\mathbf{H_u \bullet u}$ corresponding to the user data and a second component $\mathbf{H_p \bullet p}$ corresponding to the parity data such that $\mathbf{H_u \bullet u + H_p \bullet p} = 0$. A u calculating means for calculating a vector $\underline{u} = \mathbf{H_u \bullet u}$, and a $p = \underline{P}\,\underline{u}$ calculating means for calculating ~~$p = \mathbf{H_u}^{-1} \cdot \underline{u}$~~ $p = \mathbf{H_p}^{-1} \bullet \underline{u}$.

Kindly replace the paragraph beginning on page 8, line 1, with the following:

According to a twenty-first aspect of the present invention, the u calculating means calculates the vector $\underline{u} = \mathbf{H_u \bullet u}$ prior to the $p = \underline{P}\,\underline{u}$ calculating means calculating ~~$p = \mathbf{H_u}^{-1} \cdot \underline{u}$~~ $p = \mathbf{H_p}^{-1} \bullet \underline{u}$.

Kindly replace the paragraph beginning on page 8, line 4, with the following:

According to a twenty-second aspect of the present invention, a data transmission system is provided for transmitting user data to and receiving data from a communication channel. A low-density parity-check code encoding means encodes user data u of length N_u, by inserting parity data p of length N_p into output data c of length N in accordance with a parity matrix H such that $\mathbf{H \bullet c} = 0$, comprising, and an input means inputs the user data of block length N_u. A H c decomposer means is provided for decomposing $\mathbf{H \bullet c}$ into a first component $\mathbf{H_u \bullet u}$ corresponding to the user data and a second component $\mathbf{H_p \bullet p}$ corresponding to the parity data such that $\mathbf{H_u \bullet u + H_p \bullet p} = 0$. A u calculating means

calculates a vector $\underline{u} = \mathbf{H_u \bullet u}$, and a $p=\underline{P}\,\underline{u}$ calculating means for ~~calculates~~ calculating ~~$p = \mathbf{H_u}^{-1} \cdot \underline{u}$~~ $p = \mathbf{H_p}^{-1} \bullet \underline{u}$. A transmitter means transmits an output of the low-density parity-check code encoding means to the communication channel. A soft channel decoding means decodes data from the communication channel, and a soft low-density parity-check code decoding means decodes data decoded by the soft channel decoding means.

Kindly replace the paragraph beginning on page 27, line 2, with the following:

The present invention directed to a method and apparatus to perform low-density parity-check code encoding of user data u of length N_u, by inserting parity data p of length N_p into output data c of length N in accordance with a parity matrix H such that $\mathbf{H \bullet c} = 0$, comprising the steps of: (a) receiving the user data of block length N_u; (b) decomposing $\mathbf{H \bullet c}$ into a first component $\mathbf{H_u \bullet u}$ corresponding to the user data and a second component $\mathbf{H_p \bullet p}$ corresponding to the parity data such that $\mathbf{H_u \bullet u + H_p \bullet p = 0}$; (c) calculating a vector $\underline{u} = \mathbf{H_u \bullet u}$; and (d) calculating ~~$p = \mathbf{H_u}^{-1} \cdot \underline{u}$~~ $p = \mathbf{H_p}^{-1} \bullet \underline{u}$.